Proposed Preschool & Primary School, at 1 Rosemead Road, in Hornsby, NSW

Traffic impact and parking assessment study

February 2020

A group of the local residents

Traffic Engineering Centre
Our clients are our partners

Traffic Engineering Centre Pty Ltd
ABN 81 153 403 199

11B Llewellyn Street
Lindfield NSW 2070
PO Box 261
Lindfield NSW 2070
Australia
Telephone +61 (0)2 9880 7606
Mobile +61 0424 277 612
Email zoran@trafficengineeringcentre.com
Website www.trafficengineeringcentre.com

Major Branch Sponsor of

AITPM Leadership in Traffic and Transport

Traffic Engineering Centre

Our clients are our partners

Revision	Details	Date	Amended By
A		28.02.2020.	ZB
B		28.02.2020.	ZB
C		01.03.2020.	ZB

Author: Zoran Bakovic,.....

Signed:

Date: 26 February 2020 .....

Please note that when viewed electronically this document may contain pages that have been intentionally left blank. These blank pages may occur because in consideration of the environment and for your convenience, this document has been set up so that it can be printed correctly in double-sided format.

Contents

1. Introduction

Traffic Engineering Centre has been commissioned by a group of the local residents to undertake a traffic impact and parking requirement study to identify potential impacts of the proposed preschool & primary school, at 1 Rosemead Road, in Hornsby, NSW (refer to Photo 1.1).

Photo 1.1
[Photo: Traffic Engineering Centre pty Ltd]

Figure 1.1: Subject site – Locality map
[Source: Nearmap]

Note: While working on this report, Traffic Engineering Centre had no access to the design plans nor discussed the proposed development with the developers.

Therefore, in regard to the development related information, Traffic Engineering Centre relied on information provided by a group of local residents, as well as the Traffic and Parking Assessment Report prepared by Varga Traffic Planning, dated 29 November 2019.

It is understood as the following:

Blue Gum Community School is a small community based independent school to be located at 1 Rosemead Road, in Hornsby, NSW.

This development application is therefore seeking approval to accommodate up to 32 children at the preschool (3-5 olds only) and 48 children at the primary school (5-12 year olds).

Off-street parking is to be provided for a total of 12 cars plus an on-site drop-off/pick-up bay. Vehicular access to the car parking and drop-off / pick-up area is to be provided via separate entry and exit driveway located off the Rosemead Road site frontage, with the proposed entry driveway utilising the existing driveway cross over, although with some minor modifications.

The proposed development involved the alteration and additions to the "Mount Errington" dwelling house on the site to facilitate its conversion to a new pre-school and primary school.

There would be provided 12 on-site, off-street parking spaces, of which 9 parking spaces would be allocated in a secure rear area, and would be open only during drop-off/pick-up hours. An additional 3 parking spaces are to be located in front of the secure rear parking area and are to be allocated to staff.

By law, parents must sign their children enrolled ay the pre-school in/out at the start /end of the day. These parents will utilise the rear parking area.

Primary school aged children, however, are not required to be signed in / out, therefore and on-site 'kiss & drop' area is to be provided directly outside the western side of the building.

Vehicular access to the car parking and drop-off/pick-up area is to be provided via separated entry and exit driveways off the Rosemead Road site frontage.

Operational Characteristics

The preschool (ages 3-5) will offer three enrolment options:

- Short day (6 hours): 9:00am to 3:00pm
- Mid day (8 hours): 8:30am to 4:30pm
- Full day (10 hours): 8:00am to 6:00pm

The primary school (ages 5-12) will comprise the following:

- 9:00am to 3:00pm
- Before and after school care (8:00am-9:00am & 3pm-6pm, respectively)

The primary school morning drop-off will typically occur between 8:30am - 9:00am whilst the afternoon pick-up period will typically occur between 2:50pm - 3:20pm. In this regard, the afternoon pick-up will be staggered into 10 minute blocks in order to "dilute" the number of parents on site. A typical day would be broken down as follows:

Morning

- 7:45am staff arrive
- 8:00am long day preschool children and before school care primary students start arriving
- 8:30am-9:00am mid day preschool and primary drop-off
- 9:00am short day preschool drop-offs begin

Afternoon

- 2:50pm-3:20pm staggered primary pick-up and short day preschool children with siblings in primary school
- 3:00pm-3:30pm short day preschool pick-up for those without primary siblings
- 4:30pm-4:45pm mid-day preschool pick-up and any after school care primary
- 5:45pm-6:00pm long day preschool pick-up and any after school care primary
- 6:15pm end of day for staff

2. Road hierarchy

The road hierarchy allocated to the road network adjacent to or/and in vicinity to the development site by the Roads and Maritime Services is illustrated on Figure 2.1 (the Figure 2.1 was extracted from Varga Traffic Planning's report).

According to the Figure 2.1, **Rosemead Road** and **William Street** are **local**, unclassified **roads** which are primarily used to provide vehicular and pedestrian access to frontage properties.

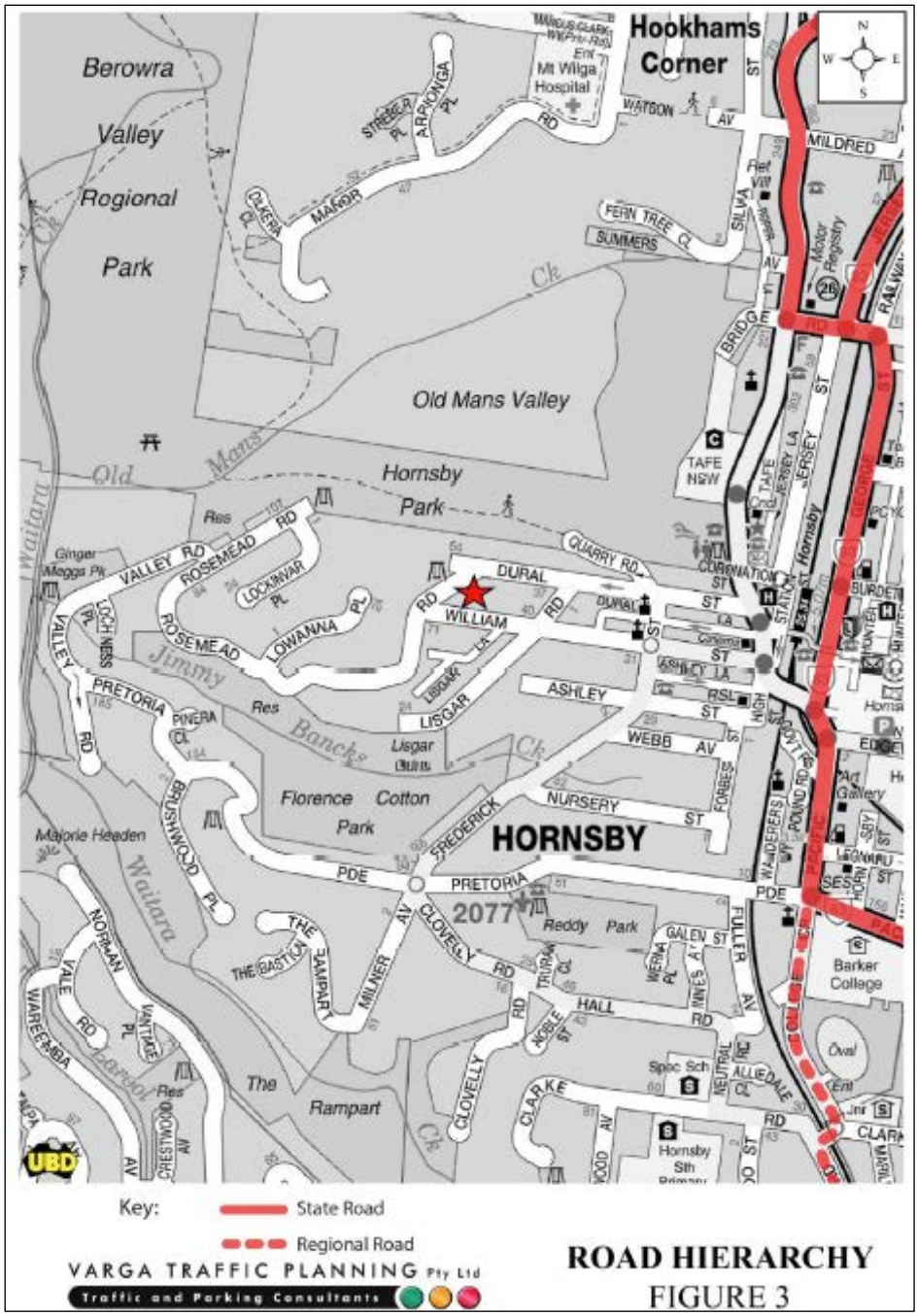

Figure 2.1: Road hierarchy
[Source: report prepared by Varga Traffic Planning Pty Ltd]

Figures 2.2 & 2.3 depict the location of the development site and the adjacent road network.

Figure 2.2: Subject site and adjacent road network - Locality map
[Source: Nearmap]

Figure 2.3: Subject site and adjacent road network - Locality map
(Source: Nearmap)

At the intersection of Peats Ferry Road and Dural Street, the right turn from Peats Ferry Road into Dural Street is banned between 7.00am and 9.00am, and, again, between 3.00pm and 6.00pm (refer to Photo 2.1).

These right-turn restrictions on Peats Ferry Road coincide with the proposed school's drop-off and pick-up times, meaning that the right-turn at this intersection could not be utilised by the southbound travelling parents intending to drop-off and/or pick-up their children to/from the school respectively.

Photo 2.1
[Photo: Traffic Engineering Centre pty Ltd]

Also, there would be no reason for northbound travelling parents to turn left at this intersection as, these parents would have an opportunity to turn left toward the school, at the Peats Ferry Road / William Street intersection (refer to Photo 2.2).

Photo 2.2
[Photo: Traffic Engineering Centre pty Ltd]

In all likelihood and foreseen circumstances, the vast majority of vehicles generated by the proposed development would utilise the Peats Ferry Road / William Street intersection to turn into William Street on their way to the school. As shown in Figure 2.1, Dural St is one-way for westbound traffic between Quarry Rd and Lisgar Rd. Therefore, Dural St would get very little use by persons travelling to the proposed school.

3. Existing public transport service

Based on the measurements from the 'nearmap', the Hornsby railway station and bus stops are located approximately more than 850m and 775m east of the site, along William Street and Dural Street, respectively (refer to Figures 3.1 & 3.2).

We are of the opinion that this is not an acceptable walkable distance, as, typically, people are **not** willing to walk such a [quite substantial] distance with their children.

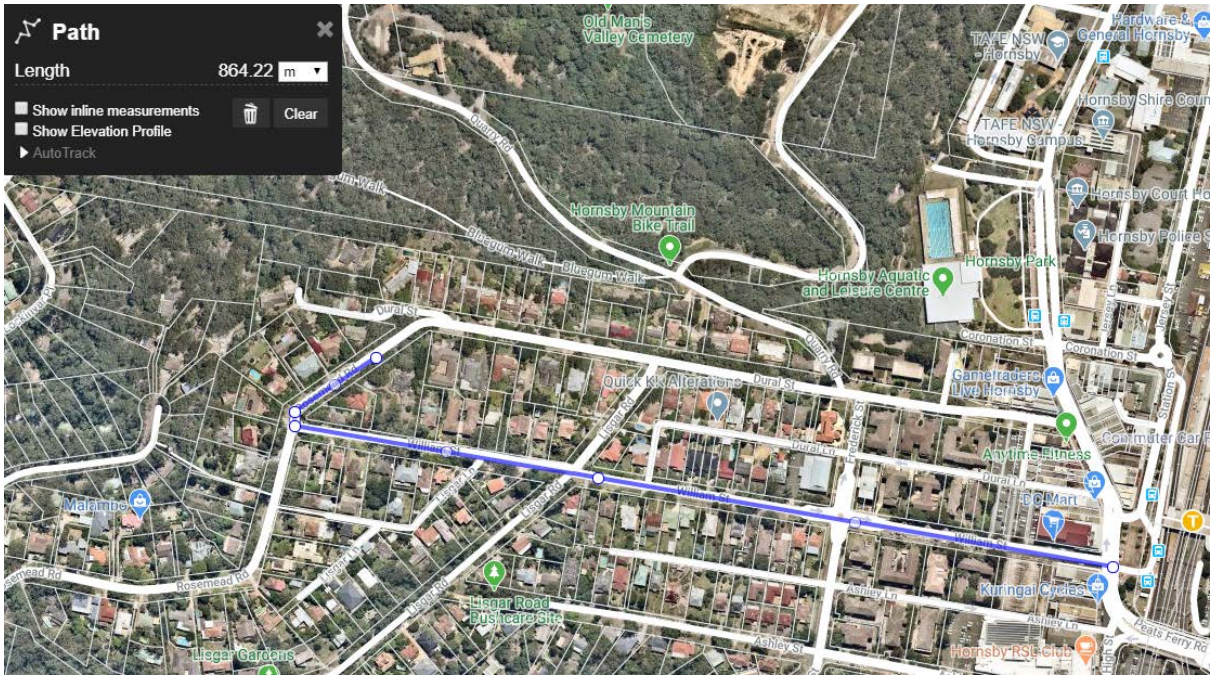

Figure 3.1
(Source: nearmap)

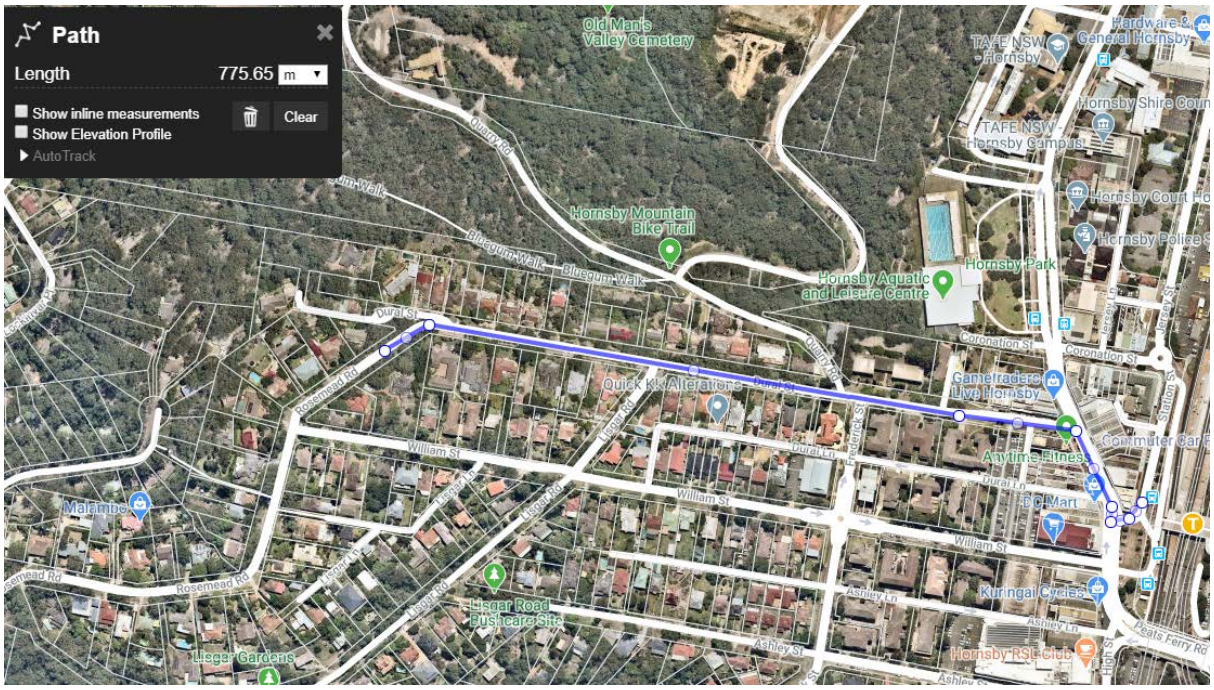

Figure 3.2
(Source: nearmap)

As mentioned in Varga Traffic Planning's report, we agree that *"people are willing to walk up to 800m to get to public transport"*.

However, this approach is applicable to e.g. commuters (or the staff members, in this case) who walk from their respective homes to the bus stops or from the bus stops to their places of work, e.g. in the morning, or kids/students who walk from a public transport / bus stop to their respective schools, or similar, when they would walk up to 800m at a time.

Yet, this is not applicable to the parents who may consider using the available public transport to take their kids to the school, as they would need to walk between 1.5km to 1.7km at a time, first in the morning and then in the afternoon, in order to walk with their kids to/from the school and the public transport / bus stop.

Therefore, the location of the Hornsby railway station and bus stops would not facilitate reduced car usage by the parents.

4. Existing traffic condition

As William Street is the most likely street to carry most of the traffic toward and from the subject site, Traffic Engineering Centre commissioned the 7day/24hrs mid-block traffic count at 2 (two) locations, as shown on Figure 4.1:

The count provides an estimate of the existing traffic volumes and the current use of William Street close to the development site.

Figure 4.1: Approximate mid-block traffic count locations
(Source: nearmap)

The collected traffic flow volumes were used to establish the existing baseline traffic concerning traffic peak hours, traffic volumes, traffic composition, and travel speed.

Site #1 – Upper William Street:

The survey showed that (refer to Table 4.1 and Figure 4.2):

- on the weekdays, morning peak traffic hours occurred between 7:00am and 9:00am, while, in the afternoon, traffic volumes peak between 3:00pm and 6:00pm;
- on average, between 7.00am and 8.00am, and between 8.00am and 9.00am, there were 75 and 75 vehicles, respectively, after ignoring results for the Tuesday, when the road was closed in the morning to remove storm debris (7.00am - 8.00am is (71+82+77+72)/4 = 75.50 and 8.00am - 9.00amis (83+68+80+70)/4 = 75.25).
- on average, between 3.00pm and 4.00pm; between 4.00pm and 5.00pm; and between 5.00pm and 6.00pm, there were 79; 83; and 90 vehicles;
- the 85th percentile speed [aka 'operational speed'] was in the order of 35.4km/h.

Job No	N5589 - William St
Client	Traffic Engineering Centre
Site	William St
Location	(West of Lisgar Lane)
Site No	ATC 1
Start Date	7-Feb-20
Description	Volume Summary
Direction	Combined

Menu

MATRIX Traffic and Transport Data

Hour Starting	Day of Week							W'Day Ave	7 Day Ave
	Mon	Tue	Wed	Thu	Fri	Sat	Sun		
	10-Feb	11-Feb	12-Feb	13-Feb	7-Feb	8-Feb	9-Feb		
AM Peak	83	48	82	80	72	76	49		
PM Peak	94	95	101	97	91	63	56	939	860
0:00	2	4	1	0	4	12	6	2	4
1:00	1	2	0	2	2	3	0	1	1
2:00	0	0	1	0	2	2	0	1	1
3:00	1	0	0	0	1	2	1	0	1
4:00	3	2	2	2	1	1	1	2	2
5:00	9	5	7	8	7	3	2	7	6
6:00	26	36	39	38	38	7	3	35	27
7:00	71	48	82	77	72	20	10	70	54
8:00	83	11	68	80	70	47	19	62	54
9:00	52	13	67	62	52	76	47	49	53
10:00	58	8	47	57	48	64	49	44	47
11:00	61	45	52	68	50	67	49	55	56
12:00	61	46	55	64	68	63	39	59	57
13:00	61	51	60	49	51	59	35	54	52
14:00	61	64	68	63	50	63	46	61	59
15:00	73	89	73	74	86	52	36	79	69
16:00	66	75	84	97	91	52	49	83	73
17:00	94	95	101	89	70	54	56	90	80
18:00	74	61	71	54	56	41	41	63	57
19:00	51	56	47	59	51	27	22	53	45
20:00	35	32	35	23	25	11	23	30	26
21:00	17	23	22	25	17	14	12	21	19
22:00	8	11	5	10	14	13	7	10	10
23:00	7	4	3	4	16	17	4	7	8
Total	975	781	990	1005	942	770	557	939	860

Table 4.1

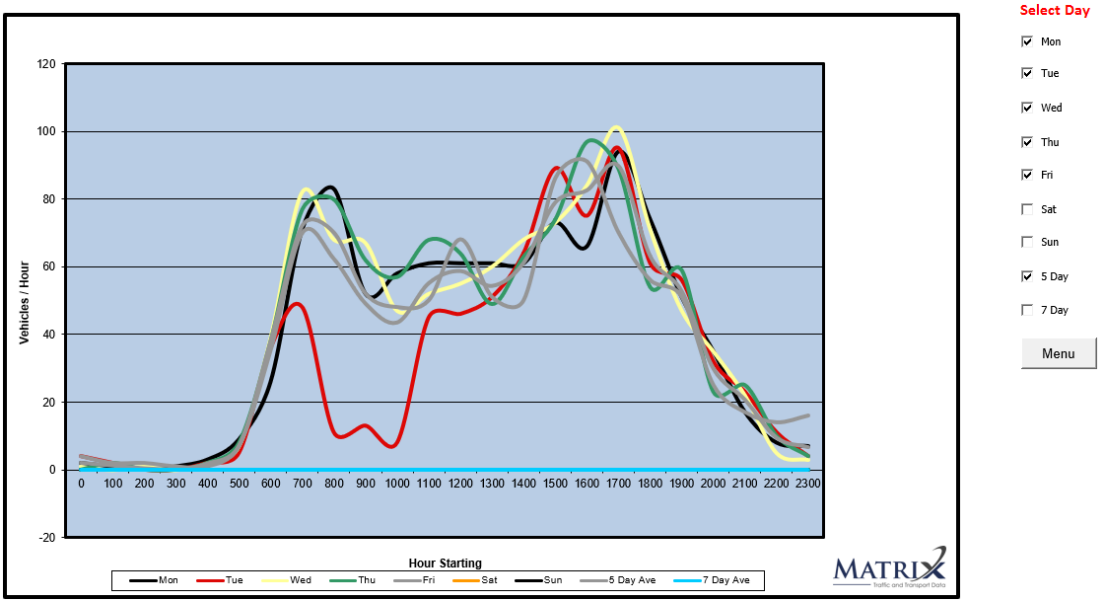

Figure 4.2

Site #2 – Lower William Street:

The survey showed that (refer to Table 4.2 and Figure 4.3):

- on the weekdays, morning peak traffic hours occurred between 7:00am and 9:00am, while, in the afternoon, traffic volumes peak between 3:00pm and 6:00pm;
- on average, between 7.00am and 8.00am, and between 8.00am and 9.00am, there were 125 and 131 vehicles, respectively;
- on average, between 3.00pm and 4.00pm; between 4.00pm and 5.00pm; and between 5.00pm and 6.00pm, there were 123; 130; and 148 vehicles;
- the 85th percentile speed [aka 'operational speed'] was in the order of 42.1km/h.

Start Date 12-Feb-20
Description Volume Summary
Direction Combined

MATRIX Traffic and Transport Data

Hour Starting	Day of Week Mon 17-Feb	Tue 18-Feb	Wed 12-Feb	Thu 13-Feb	Fri 14-Feb	Sat 15-Feb	Sun 16-Feb	W'Day Ave	7 Day Ave
AM Peak	134	140	127	137	119	119	119		
PM Peak	144	145	157	144	154	156	129	1638	1581
0:00	7	6	1	3	3	10	16	4	7
1:00	4	3	0	2	3	7	12	2	4
2:00	0	0	1	0	0	4	5	0	1
3:00	0	0	1	0	1	4	0	0	1
4:00	2	2	3	3	2	0	2	2	2
5:00	13	20	16	18	10	10	7	15	13
6:00	59	51	60	54	59	23	23	57	47
7:00	124	138	121	126	114	46	33	125	100
8:00	134	140	127	137	119	86	45	131	113
9:00	99	93	109	106	113	100	96	104	102
10:00	88	92	71	88	97	94	119	87	93
11:00	101	81	87	94	95	119	119	92	99
12:00	92	94	79	96	84	131	108	89	98
13:00	87	108	87	94	92	111	89	94	95
14:00	88	101	115	93	107	111	129	101	106
15:00	137	129	128	122	101	156	84	123	122
16:00	116	145	135	142	110	148	115	130	130
17:00	144	142	157	144	154	130	78	148	136
18:00	142	141	127	92	127	92	66	126	112
19:00	82	78	77	93	96	59	35	85	74
20:00	53	47	53	41	61	42	49	51	49
21:00	41	40	36	51	46	48	39	43	43
22:00	16	17	12	19	24	33	15	18	19
23:00	7	11	8	8	19	24	7	11	12
Total	1636	1679	1611	1626	1637	1588	1291	1638	1581

Table 4.2

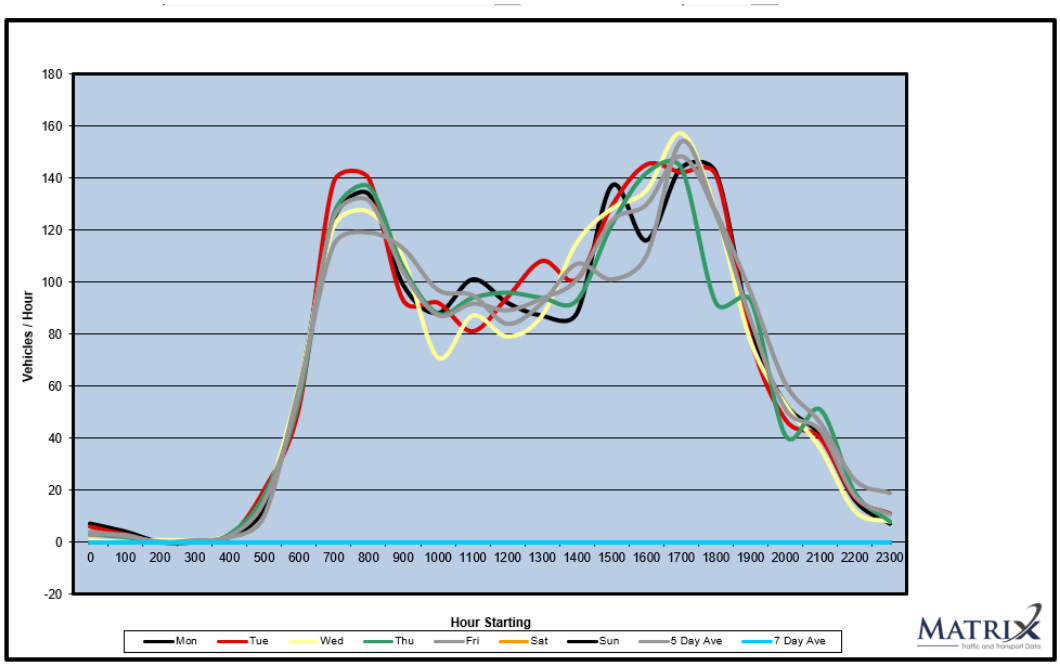
Select Day
Mon
Tue
Wed
Thu
Fri
Sat
Sun
5 Day
7 Day
Menu
Vehicles / Hour
180
160
140
120
100
80
60
40
20
0
-20
0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000 2100 2200 2300
Hour Starting
Mon Tue Wed Thu Fri Sat Sun 5 Day Ave 7 Day Ave
MATRIX

Figure 4.3

5. Projected Traffic Generation

Traffic Engineering Centre agrees with the assessment of projected traffic generation, estimated by the Varga Traffic Planning, and shown in Table 5.1, as an extract from the Varga Traffic Planning's report.

Traffic Generation Potential – Blue Gum Community School			
	7:00am-9:00am	**2:30pm-4:00pm**	**4:00pm-6:00pm**
Preschool (~16 kids)	22 vph	13 vph	-
Long day care (~16 kids)	13 vph	5 vph	11 vph
Primary school (48 kids)	36 vph	13 vph	17 vph
TOTAL	**71 vph**	**31 vph**	**28 vph**

Table 5.1
[Source: report prepared by Varga Traffic Planning Pty Ltd]

6. Environmental Capacity and Residential Streets

Research undertaken by the Roads and Maritime Services has identified a number of environmental capacity performance standards for different types of residential streets, as set out in the table below:

Environmental capacity performance standards on residential streets

Road class	Road type	Maximum Speed (km/hr)	Maximum peak hour volume (veh/hr)
Local	Access way	25	100
	Street	40	200 environmental goal
			300 maximum
Collector	Street	50	300 environmental goal
			500 maximum

Table 6.1
[Source: RMS' Guide to Traffic Generating] Developments

In the performance standards set out in Table 6.1, two levels are given - one for the desirable maximum (the environmental goal), and one for the absolute maximum.

Based on the traffic count results and the projected traffic generation, the cumulative traffic flows on William Street (the street likely to attract almost all traffic generated by the development) as a consequence of the development proposal is therefore expected to substantially exceed 200 vehicles on the upper section of William Street, between Lisgar Road and Rosemead Road; in both peak traffic periods (e.g. even in the morning, on the top of the currently 75vph, it would be add 2 (two) times 71vph (considering traffic in both direction - 71vph inbound plus 71vph outbound additional trips), equals 217vph.

In addition, on the lower section of William Street, between Frederick Street and Lisgar Road, the cumulative traffic flows are expected to reach almost 300vph (148 + 2x71 = 289vph), during the morning peak period.

These results suggest that the number of vehicles on William Street, once the development is fully operational, will be above the threshold of 200vph, which is the environmental goal for a local residential street.

These results clearly suggest that the projected increase in traffic activity, as a consequence of the development proposal, would have unacceptable implications in terms of the road network and environmental capacity.

7. Traffic safety issues

The following are some of the traffic safety issues that are likely to arise as a result of an increase in traffic volumes following the fully operational development site:

Stopping Sign Distance – much shorter than the minimum required

When looking after a sharp bend on Dural Street, toward the proposed access to the development site at the location where vehicles are supposed to turn onto the development site, the available distance was measured to be only around 26.0m (refer to Figure 7.1).

Photo 7.1
[Photo: Traffic Engineering Centre pty Ltd]

Figure 7.1
(Source: nearmap)

According to the Austroads Guide to Road Design, Part 3: Geometric Design, the Stopping Sight Distance (SSD) is *"the distance to enable a normally alert driver, travelling at the design speed on wet pavement, to perceive, react and brake to a stop before reaching a hazard on the road ahead"* and, for 50km/h speed limit zone, the very minimum required Stopping Sight Distance (SSD) is 42m (refer to Table 7.1).

Design speed (km/h)	Absolute minimum values Only for specific road types and situations[1] based on d = 0.46 [2], [3]			Desirable minimum values for most urban and rural road types based on d = 0.36			Desirable values for major highways and freeways based on d = 0.26	
	R_T = 1.5s[4]	R_T = 2.0 s[4]	R_T = 2.5s	R_T = 1.5 s[4]	R_T = 2.0 s[4]	R_T = 2.5 s	R_T = 2.0s	R_T = 2.5 s
40	30	36	–	34	40	45	–	–
50	42	49	–	48	55	62	–	–
60	56	64	–	64	73	81	–	–
70	71	81	–	83	92	102	113	123
80	88	99	–	103	114	126	141	152
90	107	119	132	126	139	151	173	185
100	–	141	155	–	165	179	207	221
110	–	165	180	–	193	209	244	260
120	–	190	207	–	224	241	285	301
130	–	217	235	–	257	275	328	346

Table 7.1: Stopping sight distance for cars on sealed roads
[Source: Austroads' Guide to Road Design, Part 3: Geometric Design]

In other words, introduction of, on average, at least 71 ingress vehicles' turning movements at the proposed location for the entry driveway [where, currently, the existing driveway is] would significantly increase the chance for severe crossing turning collisions to occur as result of the fact that even an alert approaching driver, travelling at the speed limit, may not have enough time or distance to perceive, react and brake to a stop before reaching a turning vehicle on the road ahead, at the entry to the subject site (refer to Figure 7.2).

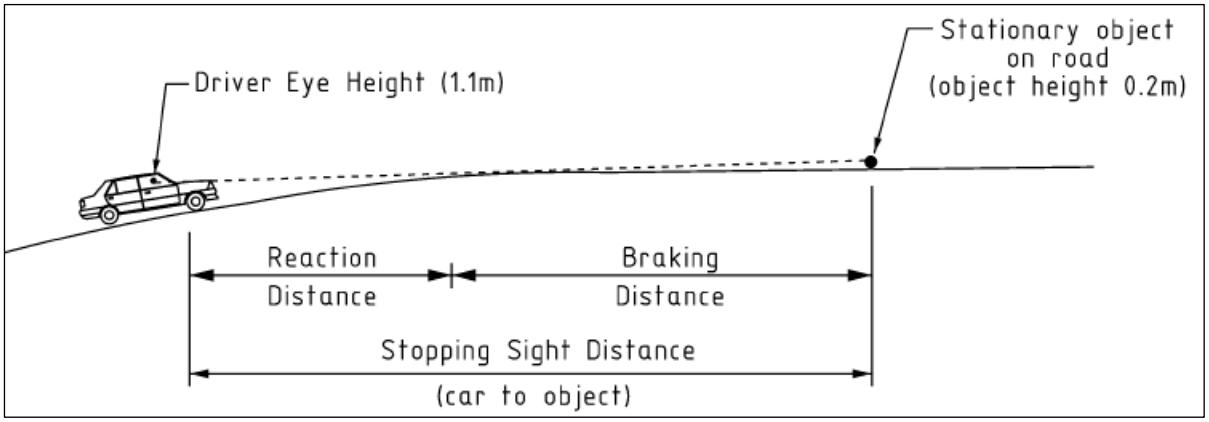

Figure 7.2: Car stopping sight distance
[Source: Guide to Road Design, Part 3: Geometric Design]

As a quantitative assessment, if the primary school is operational only 40 weeks per year, with the proposed traffic generation of 71vhp, in the morning, and if assumed that only 70% of those vehicles would turn into the subject site, it practically means that [considering the substandard stopping sight distance] the development site would create at least around 10,000 additional hazardous situations over a period of only 1 year – the hazardous situations which currently do not exist. The number of conflicts is likely to be even much higher, considering the fact that the pre-school is going to be operation year-round.

In addition, this substandard sight distance significantly creates the chance for rear-end collision between a vehicle slowed down in order to turn left into the development site and a southbound through travelling vehicle on Rosemead Road.

In other words, with a left turning vehicle still on the road, the available Stopping Sight Distance would be even shorter than the measured 26m (refer to Photomontage 7.2).

Photomontage 7.2
[Photo: Traffic Engineering Centre pty Ltd]

<u>William Street – not wide enough to accommodate additional traffic in safe and convenient manner</u>

At the moment, William Street is not wide enough to accommodate additional traffic in a safe and convenient manner. There is not enough width for two vehicles to pass each other (refer to 7.3).

Photo 7.3
[Photo: Traffic Engineering Centre pty Ltd]

An introduction of at least 71 inbound and 71 outbound trips over the period of only 1 hour would, in turn, on this quite narrow street, create a number conflict situations, and even some extensive queuing on William Street which, in turn, is likely to increase drivers frustration, and subsequently, the chance for a driver's mistake and ultimately collisions.

Peats Ferry Road, at the intersection with William Street – operational and safety issues

In both peak hours, almost all vehicles generated by the subject development are likely to turn from Peats Ferry Road into William Street, and continue toward the site.

However, proximity to the neighbouring Station Street / Peats Ferry Road intersection, and the fact that the existing short right turn lane could accommodate only up to 4 vehicles, at the same time (refer to Figure 7.3) does raise some serious concerns regarding the intersection's operation and safety, especially in the morning peak hour.

It is because, in the morning, the majority of predicted additional 71vph are expected to actually arrive at the intersection in the last 15 minutes before the school commences.

This practically means that, more likely than not, the right turn lane to turn into William Street would not have the capacity to accommodate all vehicles intending to turn right which, in turn, would block not only the Peats Ferry Road / William Street intersection but also would obstruct free through traffic flow at the Station Street / Peats Ferry Road intersection (refer to Figure 7.3).

Subsequently, this will increase drivers' frustration especially during the morning peak hours, thus increasing the chance for drivers' mistake and accidents to occur.

Figure 7.3
(Source: nearmap)

8. Parking implications

Traffic Engineering Centre is of the opinion that the site is unlikely to achieve the pre-planned drop-off dwell time, due to the fact that the signalised intersections along Peats Ferry Road, including the intersection with William Street, would, almost certainly, interrupt the travel time of the vehicles which, in turn, could arrive at the site mostly outside the pre-planned dwell time.

Also, considering the significant number of generated vehicles of 71vph, it is possible that in a very short period of time, e.g. within 10 minutes, far more vehicles could arrive at the site than the off-street and on-site parking facilities could accommodate, especially considering a certain number of vehicles already parked on the road by the local residents.

In addition, the drivers could utilise for parking both sides of the Rosemead Road, meaning that their school-age children could be in a situation to cross the street on their own, by mixing with a lot of vehicular movements, thus increasing the chance for a child to be struck by a vehicle.

9. Conclusions

The projected increase in traffic activities as a consequence of the proposed development would clearly have some unacceptable traffic implications on the surrounding road network in terms of road capacity and traffic safety.

Also, the increase in traffic as a result of the development would have negative impact on the residential amenity and environmental capacity.

Parking assessment suggests that the existing available parking spaces located on the streets adjacent to the subject site, may not be sufficient.

The location of the Hornsby railway station and bus stops located approximately more than 850m and 775m east of the site, along William Street and Dural Street, respectively would not facilitate reduced car usage by the parents.